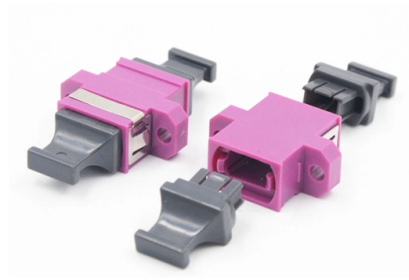


Requirements of optical transceivers for optical cables



Article Overview

Optical transceivers must match the fiber type, connector type, data rate, wavelength, and transmission distance of the optical cable to ensure reliable network performance.

Key Requirements

- 1. Fiber Type Compatibility** Optical transceivers are designed for either single-mode fiber (SMF) or multimode fiber (MMF). Single-mode transceivers are used for long-distance links, while multimode transceivers are suitable for short-range connections, typically within data centers. Using a single-mode transceiver with multimode fiber, or vice versa, can prevent the link from functioning correctly.
- 2. Connector Compatibility** Transceivers and cables must use compatible connectors, such as LC, MPO, or duplex LC. Connector mismatches or incorrect polishing types can lead to high insertion loss, signal degradation, or link failure.
- 3. Data Rate and Module Type** The transceiver must support the required data rate of the network port. For example, SFP+ modules handle 10–25 Gbps, QSFP28 modules support 100 Gbps, and OSFP modules can handle 400–800 Gbps. The cable must also support the corresponding bandwidth to maintain signal integrity.
- 4. Transmission Distance and Wavelength** Each transceiver operates at a specific wavelength (e.g., 850 nm, 1310 nm, 1550 nm) and is rated for a maximum transmission distance. The optical cable must meet these distance requirements to avoid packet loss or unstable links. For instance, OM4 multimode fiber is recommended for short-range 40G/100G links, while single-mode fiber is used for long-distance inter-building or metro connections.
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